What is claimed is:

1. A modular prosthesis for at least partial replacement of a joint articulating surface of a bone, comprising:

a) a head having a first surface adapted to cooperate with a joint surface and a second surface adapted to cooperate with an elongate stem, the second surface comprising a recessed socket;

b) an elongate stem adapted to be implanted within the medullary canal of a resected long bone, the stem having a first end that is adapted to be received within the medullary canal of the resected bone and a second end adapted to cooperate with the prosthetic head;

c) a connecting member for securely connecting the stem and head in a desired orientation, comprising

a patrix member having a generally spherical surface attached to the second end of the stem and adapted to be received in the head socket, wherein the generally spherical surface of the patrix member allows orientation of the head and stem relative to multiple axes; and

a locking member adapted to lock the head to the stem in a desired orientation, wherein the locking member retains the patrix member within the socket between the locking member and the head socket with a force sufficient to lock the patrix member securely and rigidly in place relative to the stem and the head, wherein the force is distributed around at least one ring of contact between the patrix member and the locking member and at least one ring of contact between the patrix member and the head socket.

2. The modular prosthesis of claim 1, wherein the head socket is offset from the center of rotation of the head, and the center of rotation of the patrix member is eccentric to the center of rotation of the head.

3. The modular prosthesis of claim 1, wherein the head further comprises a cavity for receiving the locking member.

4. The modular prosthesis of claim 3, wherein the cavity is concentric with the head socket.

5. The modular prosthesis of claim 3, wherein the cavity comprises an inner wall, the inner wall further comprising a locking surface for engaging a corresponding locking surface on the locking member.

6. The modular prosthesis of claim 5, wherein the locking surface comprises threads.

7. The prosthesis of claim 1, wherein the locking member comprises a locking ring having an axial bore for receiving the second end of the elongate stem and a portion of the patrix member.

8. The prosthesis of claim 7, wherein the locking ring is adapted to be received in a generally cylindrical cavity within the prosthetic head.

9. The prosthesis of claim 8, wherein the generally cylindrical cavity is concentric with the head socket.

10. The prosthesis of claim 7, wherein the locking ring comprises an outer wall which corresponds to an inner wall of the generally cylindrical cavity, and wherein the outer wall of the locking ring comprises a locking surface for engaging a corresponding locking surface on the inner wall of the generally cylindrical cavity for locking the ring within the cavity of the head,

wherein the locking ring retains the patrix member within the socket between the locking ring and the head socket with a force sufficient to lock the patrix member securely and rigidly in place relative to the stem and the head, wherein the force is distributed around at least one ring of contact between the patrix member and the locking ring and at least one ring of contact between the patrix member and the head socket.

11. The prosthesis of claim 10, wherein the locking surface comprises threads.

12. The prosthesis of claim 7, wherein the patrix member is welded to the second end of the stem, and wherein the locking ring is placed on the second end of the stem prior to welding the patrix member to the stem.

13. The prosthesis of claim 7, wherein the second end of the stem comprises a threaded male end and wherein the patrix member comprises an axial threaded bore for

engaging the corresponding threads on the male end of the stem for securely attaching the patrix member to the stem, wherein the locking ring is placed on the second end of the stem prior to attaching the patrix member to the stem.

14. The prosthesis of claim 7, wherein the head socket is frusto-conical and wherein the diameter of the frusto-conical socket decreases toward the interior of the head.

15. The prosthesis of claim 14, wherein the axial bore of the locking ring comprises a tapered bore, wherein the diameter of the tapered bore increases toward the patrix member.

16. The prosthesis of claim 1, wherein the patrix member comprises a generally spherical ball.

17. The prosthesis of claim 1, wherein the joint requiring replacement is the glenohumeral joint, wherein the elongate stem is adapted to be received in the humeral canal of a patient's humerus and wherein the prosthesis head is adapted to correspond to the general size and shape of a patient's humeral head and to articulate to the glenoid cavity of a patient's scapula.

18. A modular humeral prosthesis for replacement of the humeral head of a humerus, comprising:

(a) an elongate stem adapted to be implanted within the humeral canal of a resected humerus and having a generally spherical ball on a proximal end of the stem;

(b) a head adapted to approximate the size and shape of a humeral head and adapted to cooperate with the glenoid cavity of a patient's shoulder, wherein the head comprises

a generally cylindrical cavity recessed within an underside of the head, wherein the generally cylindrical cavity comprises an internal wall having threads on the surface of the internal wall, and

a frusto-conical socket located in the head and concentric with the generally cylindrical cavity, wherein the socket provides a housing for receiving the generally spherical ball and is positioned so that an axis of revolution of the head is offset with respect to the center of the ball;

(c) a locking ring adapted to lock the head to the stem in a desired orientation and fitted around the proximal end of the stem distal to the ball and having external threads adapted to cooperate with the internal threads of the generally cylindrical cavity, wherein the locking ring further comprises a tapered bore for receiving the proximal end of the stem and accommodating a portion of the ball, and

wherein the locking ring retains the ball within the socket between the locking ring and the head socket with a force sufficient to lock the ball securely and rigidly in place relative to the stem and the head, wherein the force is distributed around at least one ring of contact between the ball and the locking ring and at least one ring of contact between the ball and the head socket.

19. A system for surgical replacement of a joint articulating surface of a bone comprising:

(a) a selection of implant stems of various lengths and diameters, each having a first end adapted to be received within the medullary canal of a resected bone and a second end adapted for attachment to a generally spherical ball and locking ring;

(b) at least one patrix member having a generally spherical surface and adapted for attachment to the second end of an implant stem selected from (a);

(c) a selection of implant heads of various heights and diameters adapted to approximate the size and shape of the joint articulating surface requiring replacement, each having a first surface adapted to cooperate with a corresponding joint surface and a second surface comprising a recessed socket for receiving the patrix member, wherein said socket is concentric to a generally cylindrical cavity;

(d) at least one locking ring adapted to lock an implant stem selected from (a) to an implant head selected from (c) in a desired orientation to form an implant prosthesis, wherein the locking ring is adapted to fit over the second end of the implant stem and accommodate a portion of the patrix member and adapted to be received within the generally cylindrical cavity of the implant head

wherein the locking ring retains the patrix member within the head socket between the locking ring and the head socket with a force sufficient to lock the patrix member securely and rigidly in place relative to the stem and the head, wherein the force is distributed around at least one ring of contact between the patrix member and the locking ring and at least one ring of contact between the patrix member and the head socket;

(e) a selection of trial stems of various lengths and diameters corresponding to the lengths and diameters of the implant stems, each having a first end adapted to be received in the medullary canal of the resected bone and second end attached to a patrix member having a generally spherical surface and a locking ring, wherein the patrix member of the trial stem comprises an axial bore for engaging a device for extracting an assembled trial prosthesis from a patient's bone, and wherein the locking ring of the trial stem comprises an external driving surface for engaging a driver;

(f) a selection of trial heads of various heights and diameters corresponding to the heights and diameters of the implant heads, each having a first surface adapted to cooperate with a corresponding joint surface and a second surface comprising a recessed socket for receiving the patrix member of the trial stem and a concentric generally cylindrical cavity for receiving the locking ring, wherein the trial head further comprises an axial bore extending through the head, socket and generally cylindrical cavity for accommodating a device for extracting the assembled trial prosthesis from a patient's bone.

(g) a transfer device for assembling the head and stem of the implant prosthesis in the same orientation as the head and stem of the trial prosthesis after extraction of the trial prosthesis from the patient's bone.

20. The system of claim 19, wherein the patrix member of the implant prosthesis and trial prosthesis comprises a generally spherical ball.

21. The prosthesis of claim 19, wherein the second end of each implant stem comprises a threaded male end and wherein the patrix member comprises an axial threaded bore for engaging the corresponding threads on the male end of the stem for securely attaching the patrix member to the stem, wherein the locking ring is placed on the second end of the stem prior to attaching the patrix member to the stem.

22. The system of claim 19, wherein each implant stem comprises a patrix member and a locking ring, wherein the patrix member is welded to the second end of the stem, and wherein the locking ring is placed on the second end of the stem prior to welding the patrix member to the stem.

23. The system of claim 19, wherein the trial heads are plastic.

24. The system of claim 23, wherein the plastic is color coded to correspond to the various heights and diameters of the trial heads.

25. The system of claim 19, wherein the transfer device allows the extracted trial prosthesis and an implant prosthesis to be mounted in the device simultaneously.

26. The system of claim 19, wherein the transfer device comprises

a base unit adapted to receive a head retaining component;

a head retaining component having a two adjacent concave recessions, wherein a first concave recession receives the head of the trial prosthesis and a second concave

recession receives the head of the implant prosthesis, and wherein the device allows matching the orientation of the implant head to the orientation of the trial head;

a plate, wherein the plate is placed over the heads to hold the heads in position;

a stem unit, comprising a four bar linkage connecting two cylinders, wherein each cylinder is hollow and adapted to receive a cylinder insert having an axial bore for receiving and retaining the stems of the trial and implant prostheses, and wherein the stem unit allows the implant stem to be manipulated to attain the same orientation of the trial stem.

27. The system of claim 26, wherein the head retaining component is adapted to receive trial and implant heads of a specific height and diameter.

28. The system of claim 27, wherein the head retaining component is plastic.

29. The system of claim 28, wherein the plastic is color coded to correspond to the various heights and diameters of the trial and implant heads.

30. The system of claim 26, wherein the cylinder inserts are adapted to receive trial and implant stems of a particular diameter.

31. The system of claim 30, wherein the cylinder inserts are plastic.

32. The system of claim 31, wherein the plastic is color coded to correspond to the various diameters of the trial and implant stems.

33. A method for replacing a joint articulating portion of a bone in a patient comprising:

(a) resecting an end of the patient's bone;

(b) selecting a trial stem having a length and diameter that corresponds to the length of the resected bone and the diameter of the medullary canal of the resected bone, wherein the trial stem comprises first end adapted to be received in the medullary canal and second end attached to a locking ring and a patrix member having a generally spherical surface;

(c) selecting a trial head having a height and diameter that corresponds to the height and diameter of the joint articulating surface of the bone being replaced; wherein the head comprises a recessed socket for receiving the patrix member of the trial stem, and a generally cylindrical cavity concentric to the socket for receiving and engaging the locking ring;

(d) loosely assembling the trial prosthesis by placing the patrix member within the socket and engaging the locking ring within the generally cylindrical cavity of the trial head;

(e) implanting the assembled trial prosthesis into the patient's bone and testing various orientations of the trial head and stem;

(f) repeating steps (c) through (e) as necessary to select a desired head size and a desired orientation;

(g) locking the selected trial head and stem in the desired orientation;

(h) extracting the locked trial prosthesis from the patient;

(i) mounting the trial prosthesis in a transfer device;

(j) selecting an implant head and stem that correspond to the size and shape of the trial head and stem, wherein the implant head comprises a first surface adapted to cooperate with a joint surface and a second surface comprising a generally cylindrical cavity and a recessed socket, and wherein the implant stem comprises a first end adapted to be received within the medullary canal of the resected bone and a second end attached to a patrix member having a generally spherical surface and adapted to be received in the recessed socket of the head;

(k) loosely assembling the implant head and stem to form an implant prosthesis and mounting the implant prosthesis in the transfer device;

(l) using the transfer device to manipulate the stem of the implant prosthesis to match the orientation of the locked trial prosthesis;

(m) locking the implant prosthesis head and stem in the selected orientation using a driver to engage a locking ring fitted around the neck of the implant stem and adapted to engage the generally cylindrical cavity in the implant head and a portion of the patrix member, and

wherein the locking ring retains the patrix member within the head socket between the locking ring and the head socket with a force sufficient to lock the patrix member securely and rigidly in place relative to the stem and the head, wherein the force is distributed around at least one ring of contact between the patrix member and the

locking ring and at least one ring of contact between the patrix member and the head socket; and

(n) removing the locked implant prosthesis from the transfer device and implanting the prosthesis into the patient's resected bone.

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